

INSTRUCTIONS FOR INSTALLING MODIFICATION KITS TO PROVIDE
VERTICAL TABULATION AND TRANSMITTER DISTRIBUTOR CONTROL
ON A MODEL 28 PRINTER

The following chart pertains to Bell System only:

Unit	Teletype Code	Bell System Code
Typing Unit	LP5, LP28, LP29 LP31, LP32, LP33	28A 28B, 28B1, 28B2, 28C, 28F, 28G
Electrical Service Unit	LESU7	28B
Cabinet	LAC202** LAC204**	28A 28B

1. GENERAL

a. Vertical Tabulation With Page Feed-Out.

(1) A vertical tabulation modification kit when installed on a Model 28 Sprocket Feed Printer provides page feed-out and vertical tabulation.

(a) On page feed-out a form is automatically advanced to the first printing line of the succeeding form from any point on the previous form when a page feed-out selection is received. Forms two to fifteen inches in length can be accommodated by ordering a gear and disk set (listed in Table 1).

(b) On vertical tabulation a form is advanced to any predetermined position within that form.

b. The Modification Kits are:

*154760 through 154769, 197850, 197849, 192706 Modification Kits (listed in Table 1) provide the parts (gear and disk) that vary with the various lengths of forms for sprocket feed units with vertical tabulation. The 197850 or 197849 Modification Kit should be used with the 154742 Modification Kit (Specification 5854S) which provides four lines per inch because of the special length of form used.

154770 Modification Kit (listed in Paragraph 1.c.) provides vertical tabulation for sprocket feed printer on upper case "J" and "Z" for Bell System.

154771 Modification Kit (listed in Paragraph 1.d.) provides vertical tabulation for

sprocket feed typing units LP11 and up.

157530 Modification Kit (listed in Paragraph 1.e.) provides stunt box parts for upper "Z" ("SC UC Z") selection.

176569 Modification Kit (listed in Paragraph 1.e.) provides stunt box parts for upper case "J" ("SC UC J") selection.

163518 Modification Kit (listed in Paragraph 1.f.) is used to adapt the vertical tabulator control mechanism for use with a Transmitter Distributor (LXD).

*163535 or 178301 Modification Kit (listed in Paragraph 1.g.) provides the control for stopping an associated Transmitter Distributor while a form is being advanced for units equipped with vertical tabulator mechanism. The 178301 Modification Kit is used when transfer of the transmitter clutch magnet control current is required.

174174 Modification Kit (listed in Paragraph 1.c.) provides vertical tabulation for sprocket feed printer on upper case "J" or "Z" for other than Bell System.

The following parts, when not supplied must be ordered separately:

The 153811 and 153812 Templates are required for modifying typing units LP3 and LP5 not provided with the .140" and the .500" hole illustrated in Figure 1.

A 154650 Suppression Code Bar Clip is available to hold the suppression code bar in the spacing position. This clip is to be used when the typing unit is not equipped for selective calling and a function bar is used for a "SC UC" code selection.

<u>NEW PART</u>		<u>WHEN USED</u>	<u>OLD PART</u>
162728	Line Feed Slide Arm	Used when the 162729 Bar is required	150919 Arm
160572	Stripper Slide	Used when pawl is pre-stripped in Slot 38,39 and 40 of stunt box	153303 Stripper Slide
160573	Bail w/Studs		153302 Bail Blade Assembly
160576	Stripper Slide	Used when pawl is pre-stripped in Slot 39 and 40 of stunt box.	155060 Stripper Slide
160577	Bail w/Studs		155061 Blade w/Studs
160519	Stripper Blade	Used on LP7 and below.	150915 Stripper Blade
160520	Blade w/Stud		150524 Bail Assembly
162729	Bar (Six slots at one end)	Used on all units not so equipped.	150894 Bar (Five slots at one end.)

<u>NEW PART</u>		<u>WHEN USED</u>	<u>OLD PART</u>
150973	"Blank" type pallet	Used on 3/8 inch thick type box.	Upper case "Z" and "J" type pallet
176598	Bell Crank w/roller	Used on units equipped with 153228 Bell Crank w/roller 157511 or 152915 Reverse Line Feed Feature (Specification 57655)	

c. The 154770 or 174174 Modification Kit consist of:

			154770	174174
1	154771	Modification Kit (listed in Par. 1.d.)	X	X
1	157530	Modification Kit (listed in Par. 1.e.)	X	X
1	176569	Modification Kit (listed in Par. 1.e.)	X	X
1	157948	Key Lever FO, Z	X	X
1	158447	Key Lever TAB, J	X	X
1	160576	Slide, Stripper	X	
1	160577	Blade w/Stud	X	
1	162728	Arm, Line Feed Slide	X	
1	162729	Bar	X	
1	163535	Modification Kit (listed in Paragraph 1.g.)	X	

d. The 154771 Modification Kit consists of:

5	2191	Washer, Lock	2	152938	Bushing
1	2669	Washer, Lock	1	152943	Screw 10-32 Spl.
1	3598	Nut 6-40 Hex.	1	153185	Gear, Driving
2	41382	Spring	1	153188	Screw
1	90054	Spring	1	153189	Spring
1	35826	Washer, Flat	1	153191	Plate, Indicator
2	104807	Washer, Flat	1	153192	Spring
4	110743	Washer, Lock	1	153196	Handwheel
1	112626	Nut 10-32 Hex.	1	160486	Bail
2	119648	Ring, Retainer	1	160490	Pawl
2	119649	Ring, Retainer	1	160491	Plate
1	125011	Washer, Flat	1	160493	Plate
1	125015	Washer, Flat	1	160495	Plate
1	135716	Spring	1	160498	Plate, Mounting
1	151618	Screw	1	160499	Lever
1	151637	Screw	1	160500	Lever
3	115529	Screw	1	160502	Slide Form-Out
1	151658	Screw	1	160503	Slide, Tab

3	151737	Screw	1	160574	Arm
1	152927	Bushing	1	160578	Sleeve, Pinion
			1	179194	Bracket

e. The Modification Kits consist of:

			157530	176569
1	4703	Spring	X	X
1	72522	Wick	X	X
1	90517	Spring	X	X
1	94693	Wick	X	X
1	152641	Lever, Function	X	X
1	152653	Pawl, Function	X	X
1	152660	Plate, Spring SC	X	X
1	155131	Bar, Function SC UC J		X
1	155134	Bar, Function SC UC Z	X	
1	157200	Spring	X	X
1	157240	Spring	X	X

f. The 163518 Modification Kit consists of:

2	110743	Washer, Lock	2	172591	Spring, Contact Arm
2	151689	Screw	1	172593	Plate, Contact
1	151797	Cable Assembly	2	157899	Arm, Contact
1	172597	Block, Contact			

*g. The 163535 or 178301 Modification Kit consists of:

			163535	178301
2	2191	Washer, Lock	X	X
1	7002	Washer, Flat	X	X
*1	34432	Washer	X	X
*1	153442	Screw	X	X
1	151631	Screw	X	X
1	151722	Screw	X	X
1	153159	Cable Assembly	X	
4	155750	Sleeve, Insulating	X	X
1	160523	Plate, Mounting	X	X
1	160568	Switch Assembly	X	
1	178304	Switch Assembly		X
1	179989	Cable Assembly		X
1	45815	Washer, Lock	X	X

h. For part numbers referred to and for parts ordering information, see Teletype Model 28 Printer Parts Bulletin 1149B.

2. THEORY OF OPERATION

a. Vertical Tabulation with Page Feed-Out

(1) The operation of the feed-out mechanism is as follows:

(a) When the page feed-out code ("Fig. Z") is received followed by a "fill in" character such as FIGS, LTRS or CR, appropriate function lever pushes the form start slide forward, which, in turn, pushes the tab slide forward. The tab slide then pushes the line feed slide forward so that it unlatches the line feed clutch latch. After the clutch is engaged the form-out slide is blocked by the blocking lever, thereby, allowing the line feed clutch to be engaged continuously.

(b) The form start slide remains blocked by its blocking lever until the stop plate on the rotating disk engages the pawl, which in turn raises the blocking lever, thereby allowing the slides to return to their unoperated position and also disengages the line feed clutch.

(2) The sequence of operation of Vertical Tabulation Mechanism is similar to that of the Page Feed-Out Mechanism.

(a) On receipt of the "Figs" "J" code combination, followed by a "fill in" character such as FIGS, LTRS or CR, the function lever pushes the vertical tab slide forward to a point, where it will engage the line feed slide which, in turn, engages the line feed clutch. As the clutch is disengaged the vertical tab slide is blocked by its blocking lever, thereby allowing the line feed clutch to rotate continuously.

(b) The vertical tab slide remains blocked by the blocking lever until the stop plate on the disk engages the bail which in turn raises the blocking lever, thereby, allowing the slides to return to their unoperated position and also disengages the line feed clutch.

*(3) The transmitter control sequence is as follows:

Each of the transmitter control modification kits contains a normally closed (163535) or transfer type (178301) Contact Assembly. When either of the contact assemblies is installed the swinger is in position to be activated by an extension on each of the blocking levers. When either blocking lever is in the operated position the normally closed contacts are opened, thereby, de-energizing the clutch magnets on the associated transmitter distributor. In addition the transfer type contact transfers the clutch magnet control current to an optional external circuit.

(4) The transmitter distributor control is used as follows:

(a) When the transmitter distributor control contacts are used on the page printer the associated transmitter distributor (LXD) must be equipped with a 156773 Modification Kit to adapt it for use with the page printer control contacts. Also when the page printer is used with an LXD the printer must be equipped with a 163518 Modification Kit. These kits are used when only one "fill in character" is inserted after the tabulator code combination "Figure J" or "Figure Z". If two "fill in" characters are used there is no need for these modification kits.

(b) The function of the 156773 Modification Kit for the LXD is to open the LXD Clutch Magnet Circuit prior to operation of the "transmitter stop" control in the vertical tabulator mechanism on the Model 28 Page Printer. The "transmitter stop" contact on the LXD is open in response to either the "Fig" or "Ltrs" "Fill-In" code combination and is necessary because the opening of the "transmitter stop" contact in the Model 28 Page Printer occurs too late in the operating cycle of the LXD to stop it after the first fill in character.

(c) The function of the 163518 Modification Kit is to permit an overlapping of the contact opening times between the contact in the LXD and the transmitter stop contacts on the LP side frame. The 163518 Modification Kit consists of two normally closed contacts in the stunt box which are both wired in series with the transmitter stop contacts. The contacts in the stunt box are operated by the form-out and tabulating function levers in Slots 41 and 42.

(d) When the transmitter control contacts are used on the page printer an associated sending two shaft transmitter LBXD, LAXD, or LXCD must be equipped with a 161302 Character Generator Modification Kit (Specification 5900S). This device requires that the tabulator code be followed by two "buffer" characters (either FIGS, LTRS, or CR) to provide the "fill in" characters. The character generator will permit the automatic and continuous transmission of a pre-selected nonprinting character during the tabulating cycle of the page printer. This is done by stopping the transmitter shaft from either sensing or feeding tape and letting the distributor shaft send the "fill" character stored in the distributor storing block. A secondary tape cut from this transmission will contain these "fill" characters, thus eliminating the necessity for further control of the transmitter distributor during the tabulating cycle of the distant page printer. This feature is required when transmitting tabulated data (horizontal or vertical) into a tape switching system.

(e) The MXD or XD require no special modification kits for use with the tab contacts in the page printer.

3. INSTALLATION (Figures 7 through 10)

*a. 154770 or 174174 Modification Kit with 154760 through 154769, 197849, 197850, 192706 Modification Kit (one required).

(1) Remove the following from the typing unit: Paper tray, 153690 Idler Gear, 150902 Single-double line feed lever, stunt box, 150386 Left Ribbon Drive Link.

(2) For typing unit LP7, LP9, all necessary mounting holes for this feature are in the left side frame; open (if not previously done) a 6-40 tapped hole to a .140 body hole as shown in Figure 1.

(3) For typing units (LP3, LP5), add two holes to the side frame as shown in Figure 1; proceed as follows:

(a) Mount the 153811 and 153812 Templates as shown in Figure 1. The 150894 Tie Bar should remain in place to provide tapped holes to mount the 153811 Template.

CAUTION

Before drilling any holes, carefully cover all nearby parts to prevent chips from falling into clutches or other mechanisms.

(b) Drill .140" holes (#28 drill) through each template and open the tapped holes as shown in Figure 1.

(c) Remove the screws that mount the 153811 Template and tie the left end of the 150894 Bar down so it will clear the mounting holes in the side frame.

(d) It is recommended that the lower hole added in Paragraph 3.a.(3)(b) be opened to .500" diameter with a chassis punch. To do this, drill the .140" hole open .250", then open the hole to .500", and if necessary remove any burrs with a file. Carefully remove any covers used so as not to drop chips into the unit.

(4) Reinstall the 153690 Idler Gear (see Paragraph (12) and the 150386 Left Ribbon Drive Link.

(5) For other than Bell System, install any parts listed in Paragraph 1.c. that were ordered separately. For Bell System, replace the 150919 Arm with the 162728 Arm, replace the 150894 Bar with the 162729 Bar, replace the 155060 Stripper Slide with the 160576 Slide, replace the 155061 Blade with the 160577 Blade. Before installing the new 162729 Bar see Paragraph (23) for installation of additional parts with this bar.

(6) Add the 176569 Modification Kit to Slot 41 in the stunt box and the 157530 Modification Kit to Slot 42. Use the 157240 Spring for Typing Units LP6, LP8 and up, 157200 Spring for LP3, LP4, and LP7.

(7) Remove and discard the upper case "J" and "Z" type pallets and springs from the type box. In the thick type box (3/8") replace with the 150973 "Blank" type pallet and 157238 Spring. Insert from the hammer side of the type box. On the thin type box, no "Blank" type pallet replacement is required.

(8) Replace the 74701 Line Feed Trip Lever Spring on the 150431 Lever with the 135716 Spring.

(9) Replace the key lever (J) and (Z) on the keyboard with the 158447 and 157943 Key Levers.

*(10) Assemble the selected gear and disk modification kit, for the form length to be used (154760 through 154769, 192706, 197849, 197850), using the 160578 Sleeve, 153196 Handwheel, three 115529 Screws and 2191 Lock Washers. Mount this assembly to the 160498 Plate using the 152943 Screw, 152927 Bushing, 153189 Spring, 35826 Washer, 2669 Lock Washer, and 112626 Nut.

*(11) For the 197849 or 197850 Modification Kit, replace the 153692, 153690, 153185, and 150658 Gears with the 197735, 197736, 197737, and 197840 Gears, respectively.

*(12) The 158341 and 194052 Stop Plates are to be threaded on the long spring provided in the kit. The number 158341 Stop Plate should be equally distributed between the 194052 Stop Plates. Hook both ends of the spring together. Slip the spring over and into the groove in the retainer disk. Place the 194052 Stop Plates in the numbered slots on the disk corresponding to the length of form to be used. If all form stop positions are not to be used on the disk, omit those particular 194052 Stop Plates from the spring pile-up. The location of the 158341 Stop Plates on the disk is determined by the adjustment.

(13) Remove and discard the rear 151657 Screw which mounts the 150654 Line Feed Bar Guide but retain the 3598 Nut and the 2191 Lock Washer. Mount the bracket assembly (parts assembled in Paragraph (10) above on the left side frame. The 152938 Bushings mount under the bracket. Use the 151658 Screw and 2191 Lock Washer in the upper tapped hole, the 151618 Screw, 2191 Lock Washer and the 3598 Nut in the lower hole.

(14) Mount the 160490 Pawl w/Hub to the 160491 Plate w/Stud using the 119648 Ring Retainer and 90054 Spring. Also, mount the 160493 Adjusting Plate w/Stud to the 160491 Plate w/Stud with a 151737 Screw, 110743 Lock Washer and 104807 Flat Washer. Mount this assembly to the upper stud on the bracket assembly.

(15) Mount the 160486 Bail to the 160574 Arm w/Stud using a 119648 Ring Retainer and 153192 Spring.

(16) Mount the 160574 Arm w/Stud to the 160495 Plate w/Stud and hub using two 151737 Screws, two 110743 Lock Washers and a 104807 Flat Washer. Mount this assembly to the upper stud on the bracket assembly. Add a 119649 Ring Retainer to the upper stud on the bracket assembly.

(17) Add the 160500 and 160499 Blocking Lever w/Hub to the lower stud on the bracket assembly. The 160500 Blocking Lever is nearest the printer side frame. Secure with a 119649 Ring Retainer.

*(18) Mount two 41382 (for 160658 XD Control Contacts) or 80424 (for 178304 XD Control Contacts) Springs to the bracket assembly and their associated blocking levers.

(19) Mount the 153191 Pointer to the side frame with a 151637 Screw, 110743 Lock Washer, and 125011 Washer.

(20) Mount the 153188 Screw, 153185 Gear (see Paragraph (11)), and 125015 Washer to the side frame with the 2191 Lock Washer and 3598 Nut.

(21) Replace the stunt box, the 150902 single-double line feed lever and the 150386 Ribbon Drive Link which were removed in Paragraph 3.a. (1). The single-double line feed lever should be positioned in the single line feed slot so as not to cause irregular operation of the vertical tabulator mechanism.

(22) Hook the 135716 Spring to the 150431 Lever.

(23) Mount both the 160502 and 160503 Slides in the slots on the left end of the 162729 Bar. The bar must be removed from the printer to enable mounting the 160502 Slide. The 160503 Slide mounts in the slot to the left of the 162728 Line Feed Slide Arm. The 160503 Slide should engage the line feed slide arm when the slide is pushed toward the front of the unit. The 160502 Slide, when pushed toward the front of the unit, should also drive the 160503 Slide plus the line feed slide arm.

(24) Mount the 179194 Bracket to the left side frame using the two 151657 Screws and 2191 Lock Washers used to mount the 162729 Tie Bar to the side frame. The bracket should be positioned so that the extension with the form is up and the opening toward the front of the unit.

*b. 163535 or 178301 Modification Kit (Figure 9)

*(1) Mount the 160568 or 178304 Switch Contact Assembly to the 160523 Mounting Plate using the 151722 Screw and 2191 Lock Washer. Remove and discard from the left side frame the top 151657 Screw and 2191 Lock Washer which mounts the 151546 Stunt Box Bracket. Remove and discard the 151606 (LP3 and LP5) or 6745 (LP7) Screw and 2669 Lock Washer from the 151627 Rod from the left side frame. Then mount the 160523 Mounting Plate, 160568 or 178304 Switch Contact Assembly to the side frame using the 153442 Screw, 34432 Washer, 45815 Lock Washer, 151631 Screw, 2191 Lock Washer and 7002 Flat Washer.

(2) Wire the 160568 or 178304 Contact Assembly as shown in Figure 3 or Wiring Diagram 4355WD.

*(3) When an Electrical Service Unit LESU7 is used, the transmitter control wiring control terminates on Terminals 23 and 24 of the Cabinet LAC204**. On earlier models of the Electrical Service Unit the customer must provide wiring from the Electrical Service Unit spare leads A-30-O-BL and A-73-W-G to Terminals 23 and 24 of the Cabinet LAC202**. See Figure 3.

c. 163518 Modification Kit

(1) Assemble the 172593 Contact Plate, two 172591 Contact Arm Springs, 172597 Contact Block and two 157899 Contact Arms to form a switch assembly.

(2) Wire as shown in Figure 3.

(3) Connect the 151797 or 197998 Cable to the Contact Terminals. (See Figure 3 or 4). Use a minimum amount of solder, taking care not to allow flux to flow around the contact surfaces.

(4) Wire strap and solder the two terminals. Use same precautions as indicated in paragraph above.

(5) Place the contact assembly into position on top of the stunt box; the contact arms to be directly over the function levers in Slots 41 and 42. (Last two slots in left side of stunt box). Secure in position with the 151589 Screws and 110743 Lock Washers.

NOTE

Check to see that the contact arm insulator is in alignment with the function levers in Slots 41 and 42. If necessary, loosen the screws and position the switch to meet the requirement. Check to see that there is some clearance between the contact arm and vertical face of the clip when the play in the arm is taken up to make the clearance minimum.

(6) Connect one lead of the 151797 Cable to the swinger of the Vertical Tabulator Transmitter Control Switch. Place a short piece of tubing, supplied with the 153159 Cable, terminal after soldering.

NOTE

Care should be exercised when soldering, lacing, or routing the cables so as not to tug or pull unnecessarily on the contact spring in the stunt box causing distortion or damage to the spring.

(7) Splice the remaining lead of the 151797 Cable to the black lead of the 153159 Cable.

d. When the vertical tabulator mechanism is used on a page printer and the associated keyboard is equipped with a Model 28 Distributor (LD1 and LD5) the connector bracket on the distributor must be relocated to provide clearance for the indexing disks and transmitter control contacts on the side frame of the printer. Certain distributor units must be worked over as follows:

(1) Remove the 152460 Connector Bracket and drill two .156 diameter holes into the top plate as shown in Figure 2. Cover the lower part of the unit with a cloth to prevent chips from falling into the mechanism.

(2) Replace the 152460 Connector Bracket using the two screws and lock washers previously retained.

(3) The wires leading from the connector on the distributor may have to be tucked under the connector to provide additional clearance between the distributor and tabulator control contacts.

4. ADJUSTMENTS AND LUBRICATION (Figures 4 through 6)

For adjustment and lubrication procedure refer to standardized information, for other than Bell System see Bulletin 217B. Make the Vertical Tabulation and Transmitter Distributor Control mechanism adjustments.

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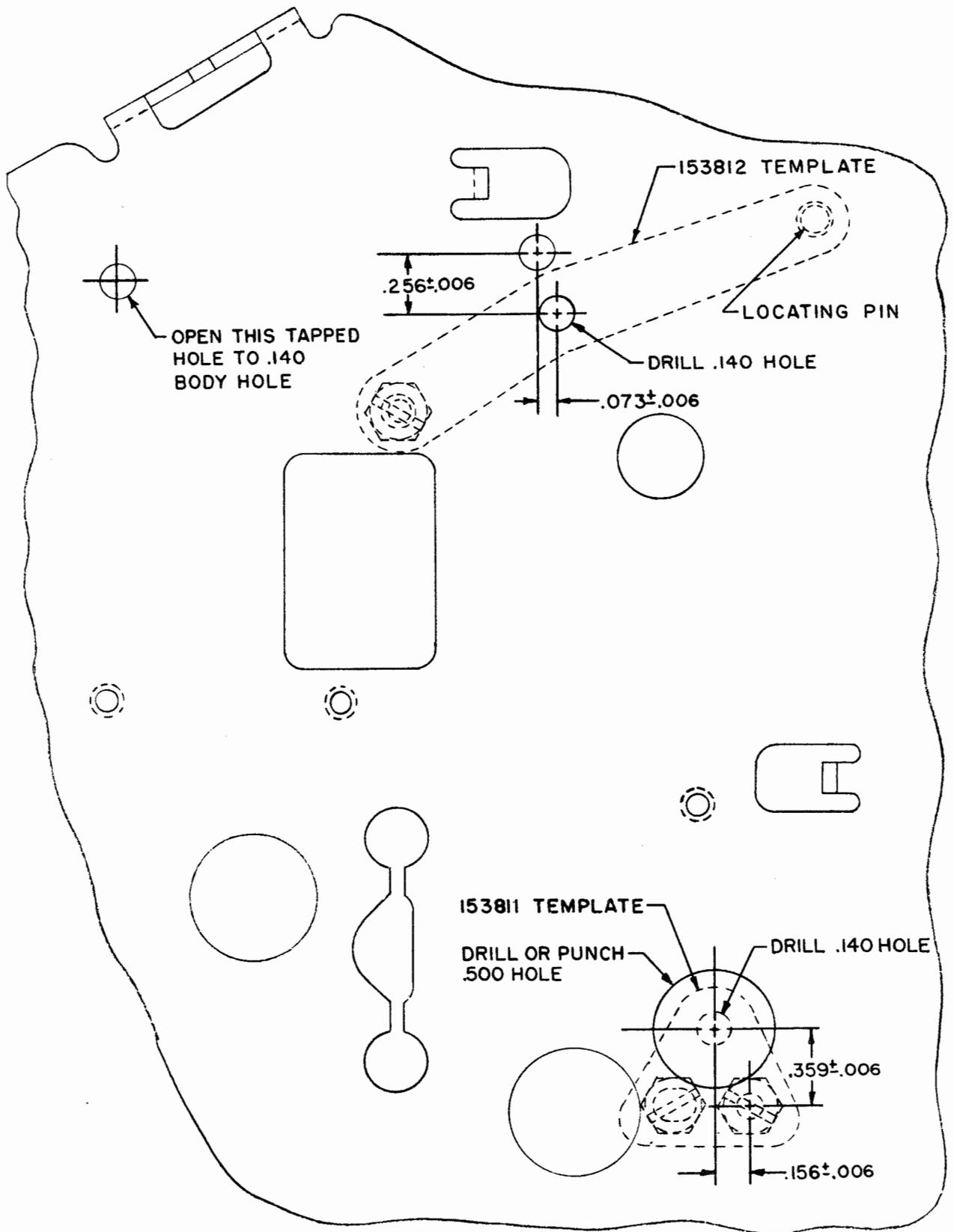
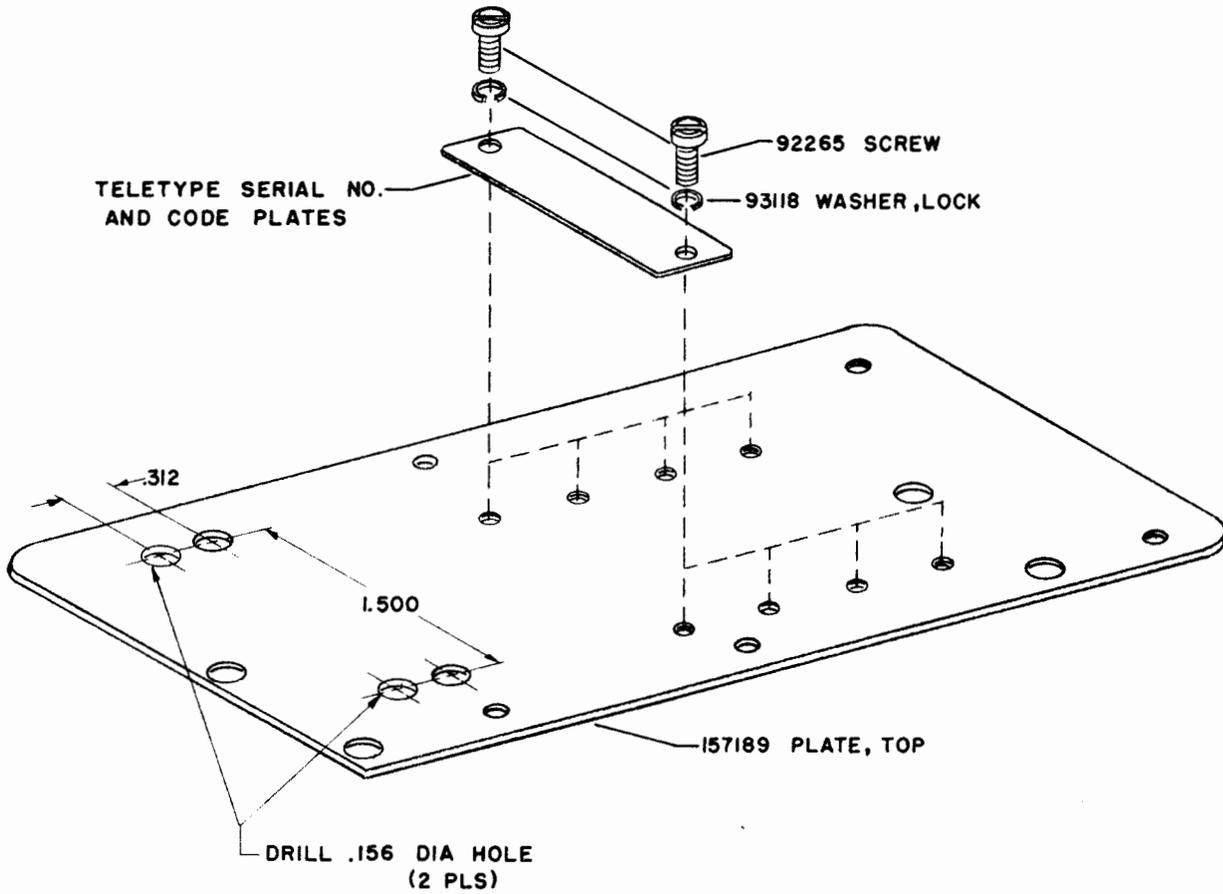


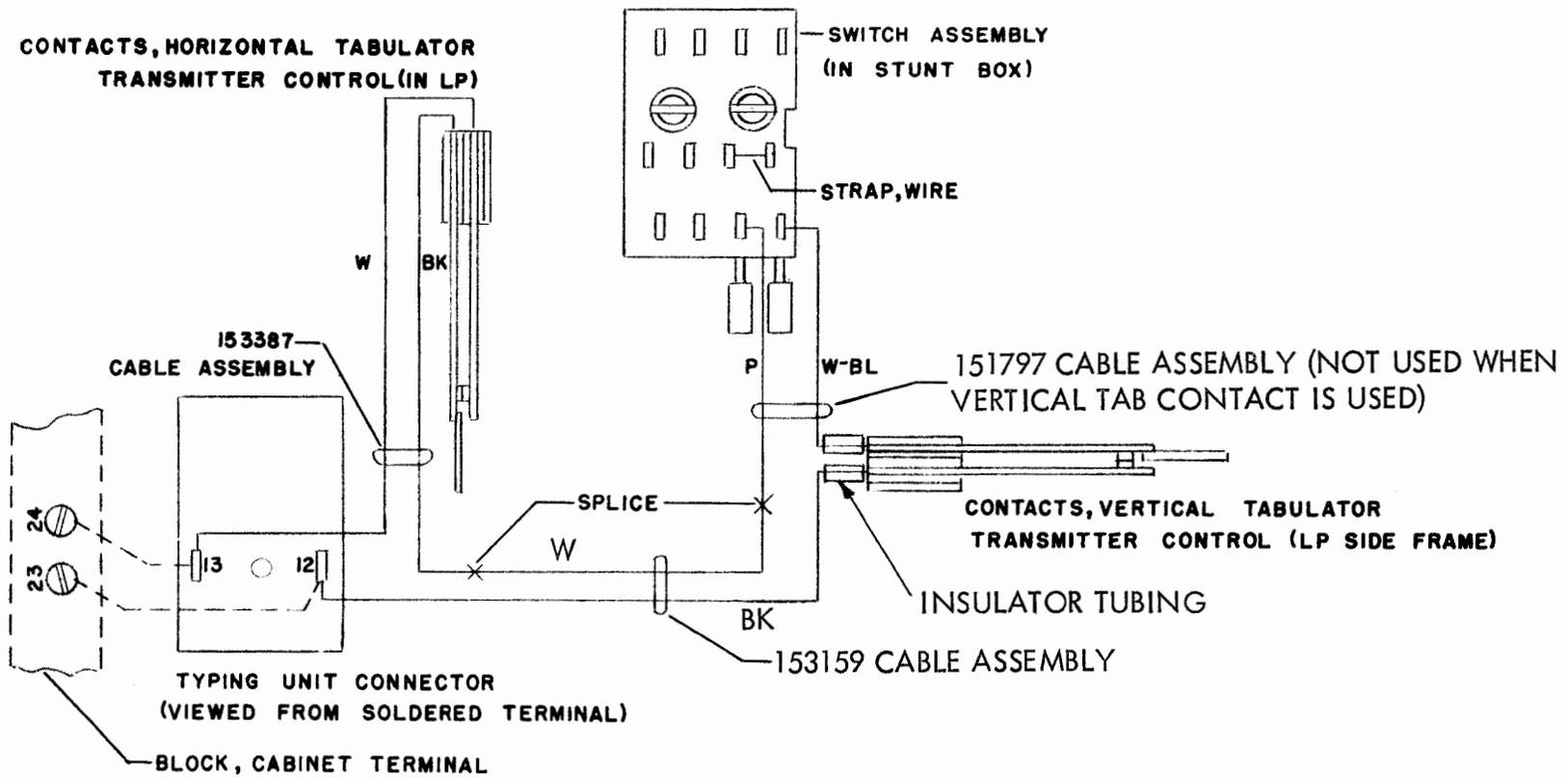
FIGURE 1



TOP PLATE FOR LD UNITS

FIGURE 2

FIGURE 3
WIRING ARRANGEMENT FOR TABULATOR CONTACTS



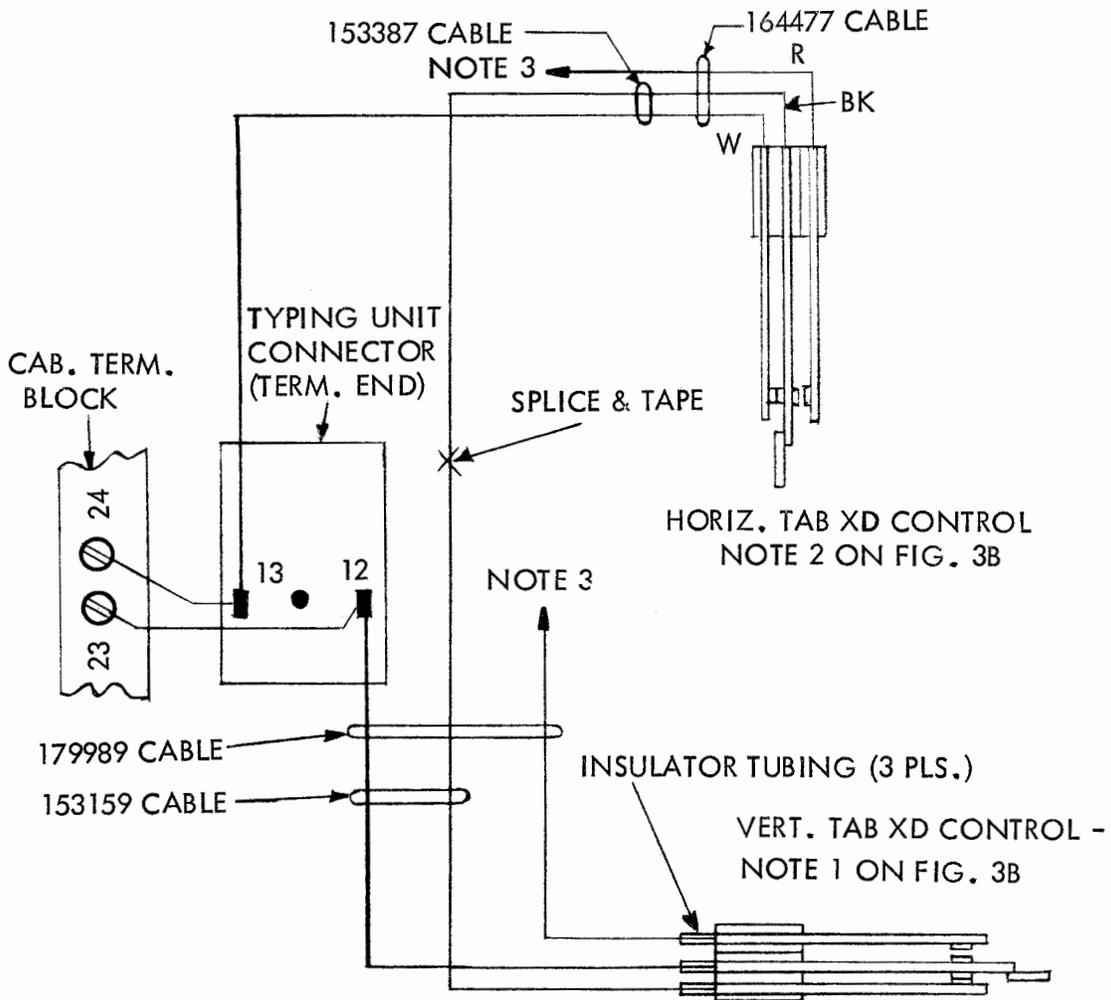
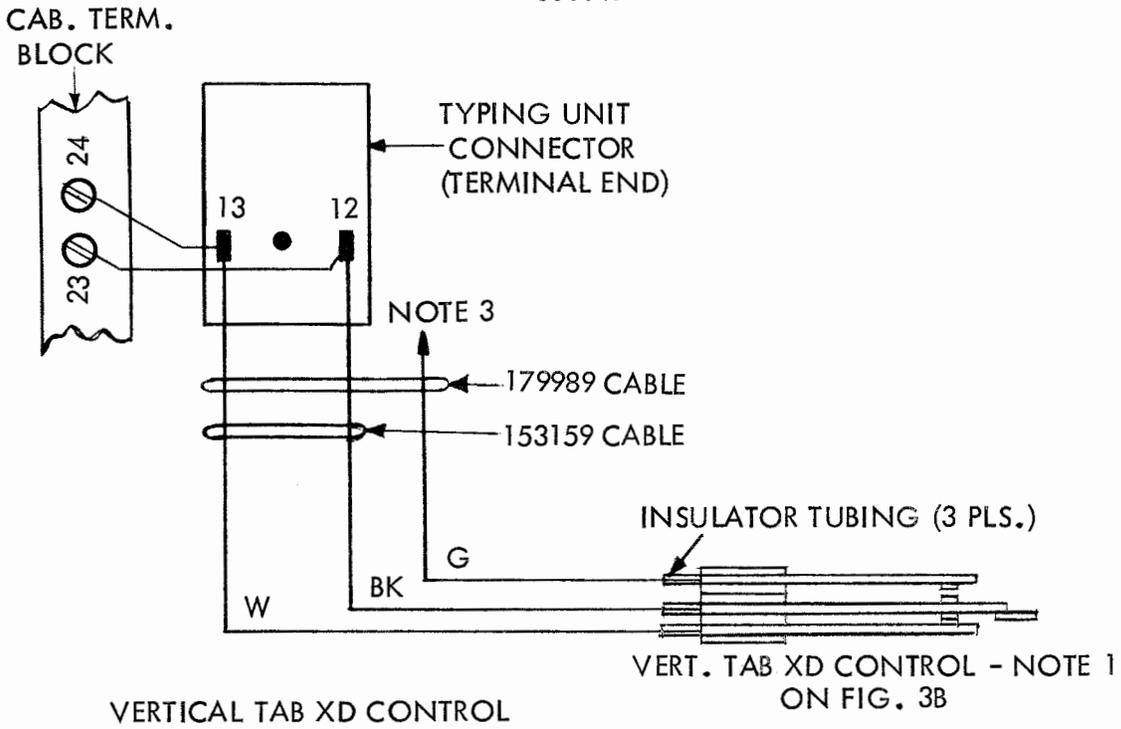


FIGURE 3A. VERTICAL & HORIZONTAL TAB XD CONTROL

NOTE 1: SHOWN FOR 178304 VERTICAL TAB XD CONTROL CONTACT.
FOR 160568 VERTICAL TAB XD CONTROL CABINET REFER TO FIGURE 3.

NOTE 2: SHOWN FOR 164478 HORIZONTAL TAB XD CONTROL CONTACT.
FOR 155721 HORIZONTAL TAB XD CONTROL CONTACT DISREGARD RED LEAD.

NOTE 3: CONNECT TO ANY UNUSED TERMINAL OF TYPING UNIT CONNECTOR.

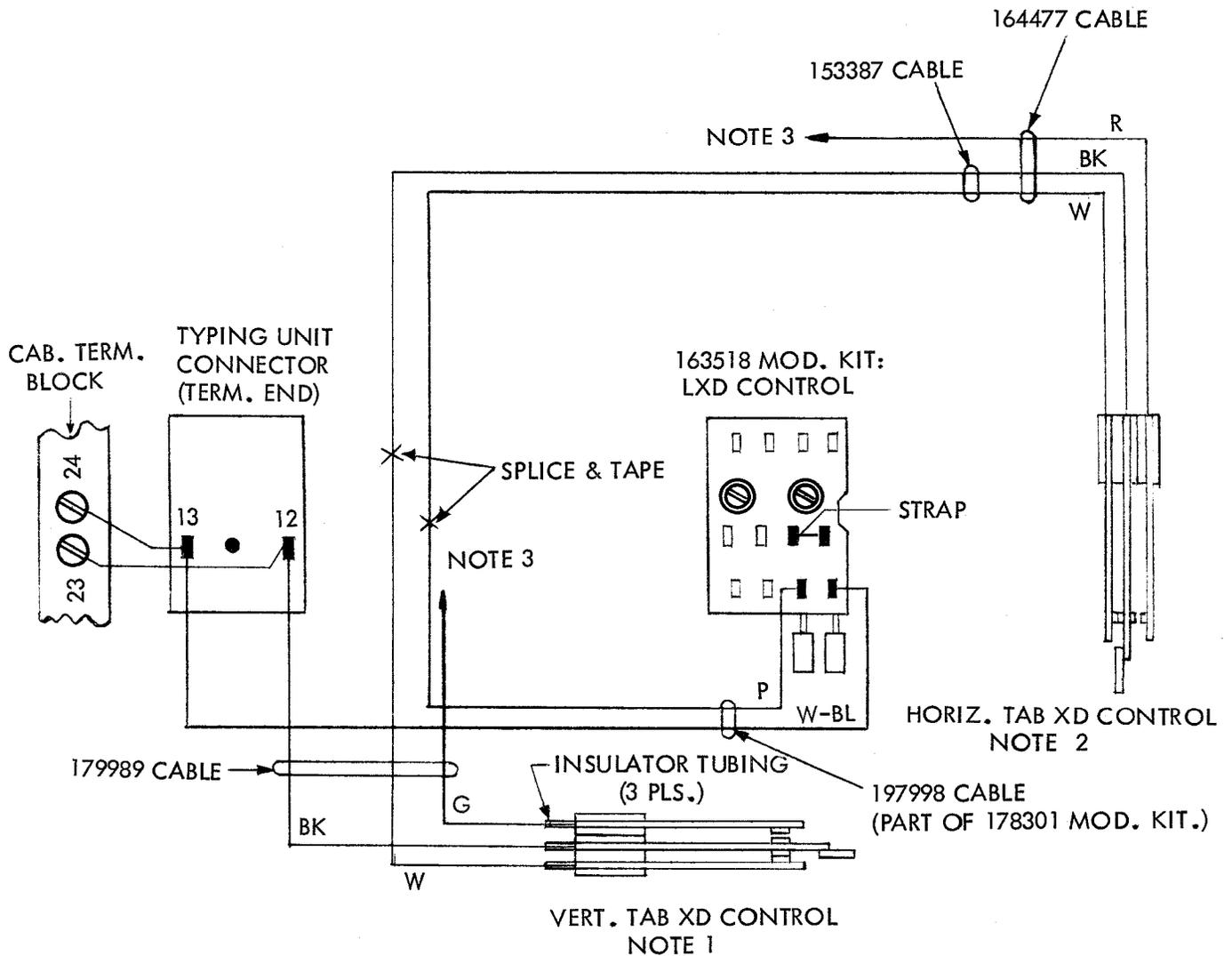


FIGURE 3B. VERT. & HORIZ. TAB XD CONTROL WHEN USED WITH 156773 MOD. KIT TO PROVIDE TIMING MECHANISM FOR LX.

VERTICAL TABULATION AND TRANSMITTER DISTRIBUTOR CONTROL

(C) PAGE FEED-OUT GEAR PLAY
REQUIREMENT

BARELY PERCEPTIBLE BACKLASH BETWEEN IDLER GEAR AND FEED-OUT GEAR

TO ADJUST

POSITION GEAR PIVOT POST WITH NUT LOOSENED.

NOTE: GEARS SHOULD MESH ACCURATELY WHEN CHECKED AT 3 EQUAL DISTANCES AROUND CIRCUMFERENCE OF GEAR.

(D) BLOCKING LEVER
SEE FIGURE 5(E) INDEXING DISK
REQUIREMENT

CLEARANCE BETWEEN INDEX PLATE AND PAWL SHOULD BE

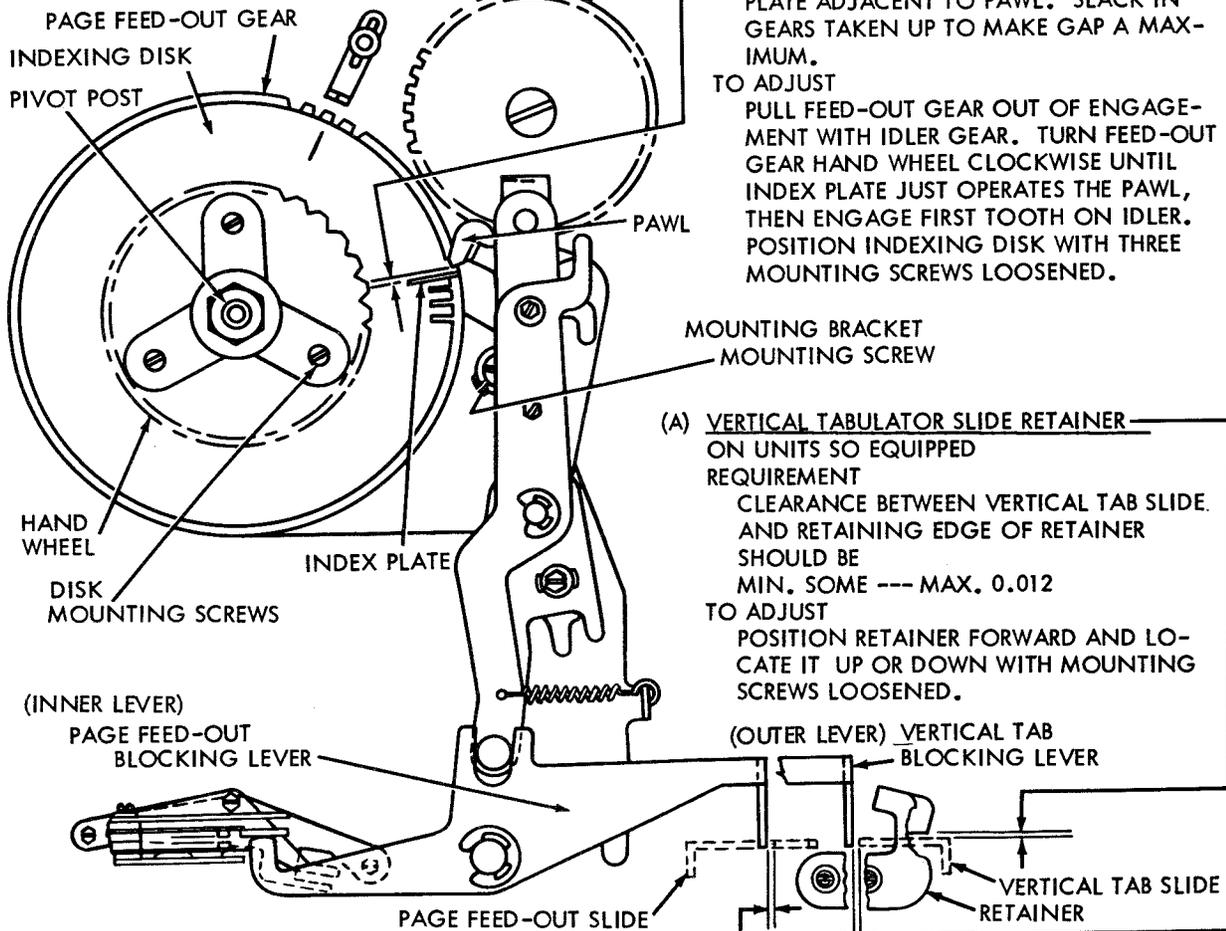
MIN. 0.020 INCH --- MAX. 0.040 INCH

TO CHECK

LINE FEED CLUTCH DISENGAGED. INDEX PLATE ADJACENT TO PAWL. SLACK IN GEARS TAKEN UP TO MAKE GAP A MAXIMUM.

TO ADJUST

PULL FEED-OUT GEAR OUT OF ENGAGEMENT WITH IDLER GEAR. TURN FEED-OUT GEAR HAND WHEEL CLOCKWISE UNTIL INDEX PLATE JUST OPERATES THE PAWL, THEN ENGAGE FIRST TOOTH ON IDLER. POSITION INDEXING DISK WITH THREE MOUNTING SCREWS LOOSENED.

(A) VERTICAL TABULATOR SLIDE RETAINER

ON UNITS SO EQUIPPED

REQUIREMENT

CLEARANCE BETWEEN VERTICAL TAB SLIDE AND RETAINING EDGE OF RETAINER SHOULD BE

MIN. SOME --- MAX. 0.012

TO ADJUST

POSITION RETAINER FORWARD AND LOCATE IT UP OR DOWN WITH MOUNTING SCREWS LOOSENED.

(B) MOUNTING BRACKET
REQUIREMENT

1. CLEARANCE BETWEEN FEED-OUT BLOCKING LEVER (INNER LEVER) AND FEED-OUT SLIDE MIN. 0.002 INCH --- MAX. 0.015 INCH

TO CHECK

SELECT UPPER CASE "Z" AND ROTATE MAIN SHAFT UNTIL PAGE FEED-OUT SLIDE IS IN ITS MOST FORWARD POSITION. TAKE UP PLAY IN PAGE FEED-OUT BLOCKING LEVER TO MAKE CLEARANCE A MINIMUM.

2. CLEARANCE BETWEEN VERTICAL TAB SLIDE AND VERTICAL TAB BLOCKING LEVER (OUTER LEVER) MIN. 0.002 INCH

TO CHECK

SELECT UPPER CASE "J" AND ROTATE MAIN SHAFT UNTIL VERTICAL TAB SLIDE IS IN ITS MOST FORWARD POSITION. TAKE UP PLAY IN VERTICAL TAB BLOCKING LEVER TO MAKE CLEARANCE A MINIMUM.

TO ADJUST

POSITION LOWER PORTION OF MOUNTING BRACKET WITH MOUNTING SCREWS LOOSENED.

FIGURE 4. TYPING UNIT, VERTICAL TABULATION AND TRANSMITTER DISTRIBUTOR CONTROL

VERTICAL TABULATION AND TRANSMITTER DISTRIBUTOR CONTROL

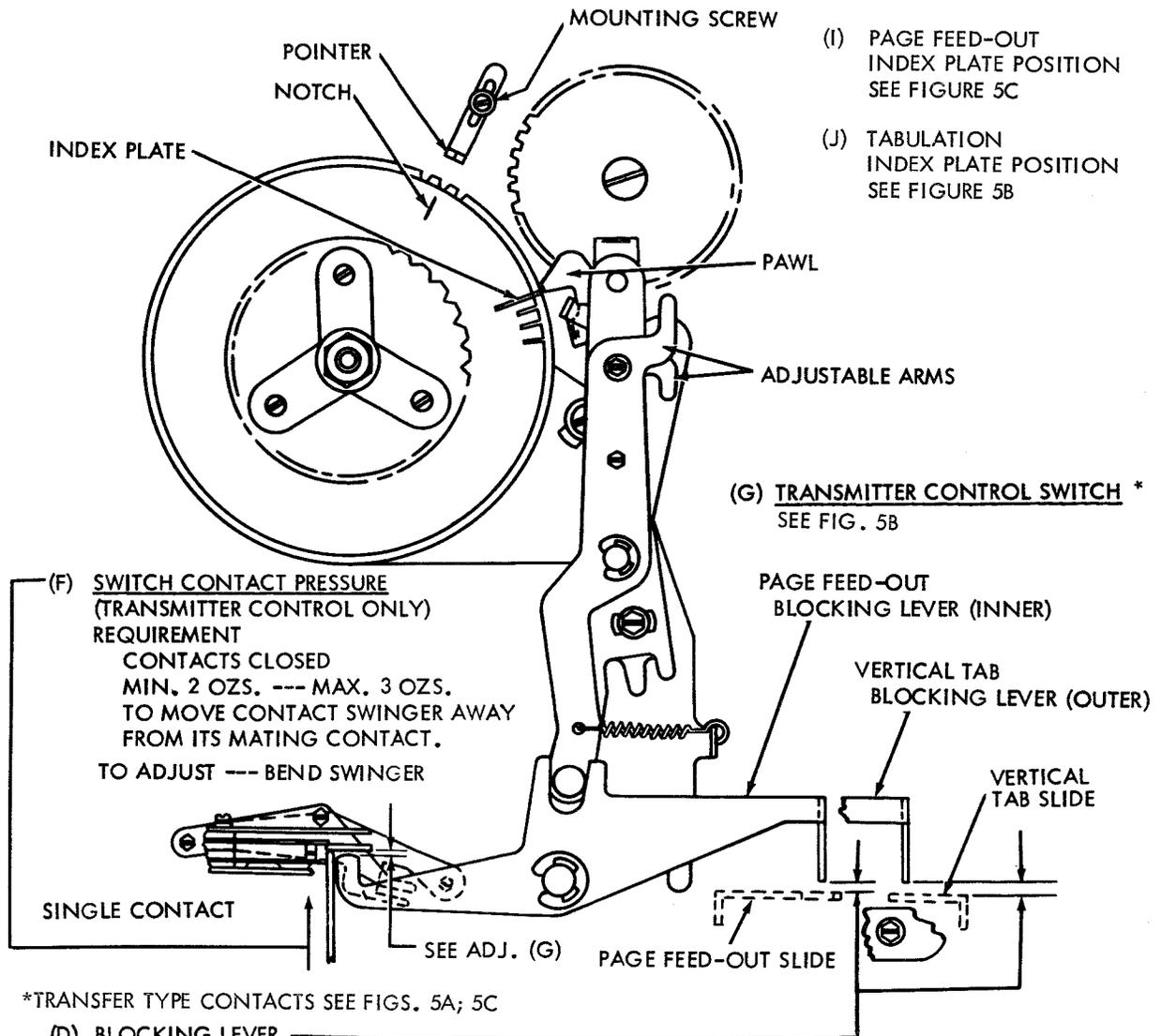
(H) POINTER

REQUIREMENT

LINE FEED CLUTCH DISENGAGED. INDEX PLATE ADJACENT TO PAWL. POINTER SHOULD LINE UP WITH NOTCH IN INDEXING DISK AND CLEAR ANY INDEX PLATE BY APPROXIMATELY 1/16 INCH.

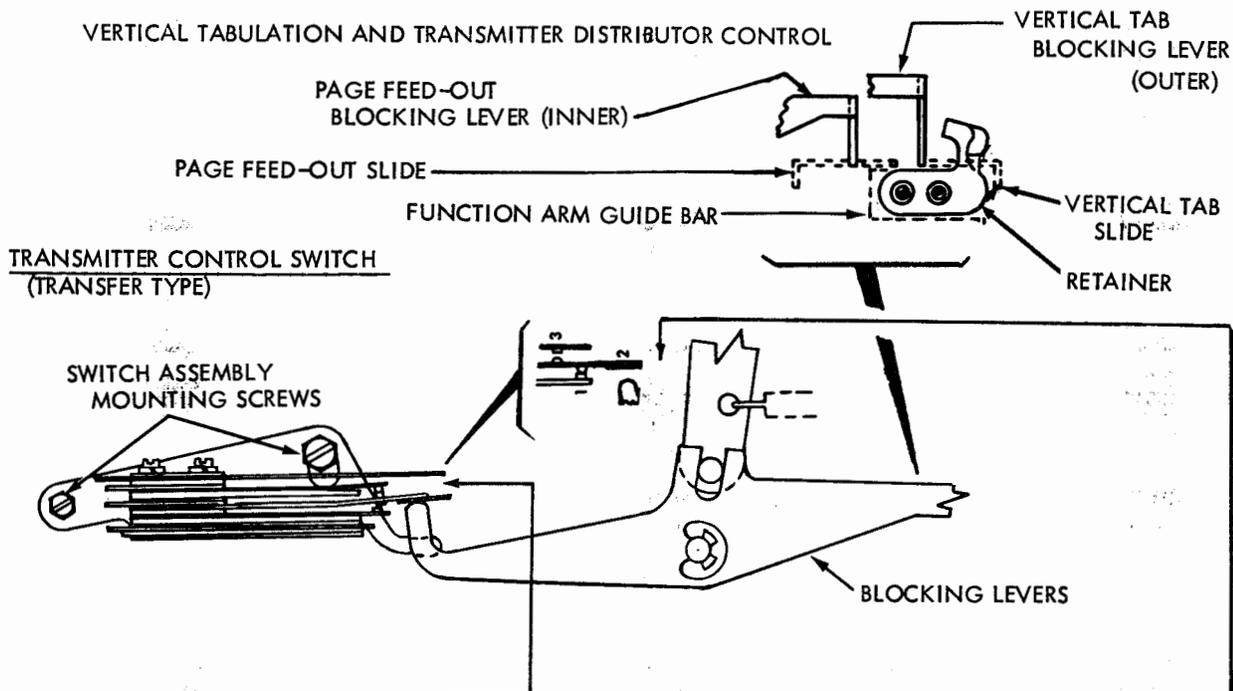
TO ADJUST

POSITION POINTER ON SIDE FRAME WITH ITS MOUNTING SCREW LOOSENED.



*TRANSFER TYPE CONTACTS SEE FIGS. 5A; 5C

FIGURE 5. TYPING UNIT, VERTICAL TABULATION AND TRANSMITTER DISTRIBUTOR CONTROL



TRANSMITTER CONTROL SWITCH (TRANSFER TYPE)
REQUIREMENTS --- FOR TRANSFER TYPE CONTACTS

1. WITH NORMALLY CLOSED (LOWER) CONTACTS CLOSED, CLEARANCE BETWEEN INSULATED EXTENSION OF SWINGER AND LOBES OF FEED-OUT AND VERTICAL TABULATOR BLOCKING LEVER SHALL BE MIN. SOME CLEARANCE ----- MAX 0.005 INCH

TO CHECK --- ROTATE MAINSHAFT UNTIL FEED-OUT AND VERTICAL TABULATOR BLOCKING LEVERS ARE UNOPERATED (BLOCKING LEVERS RESTING ON SLIDES).

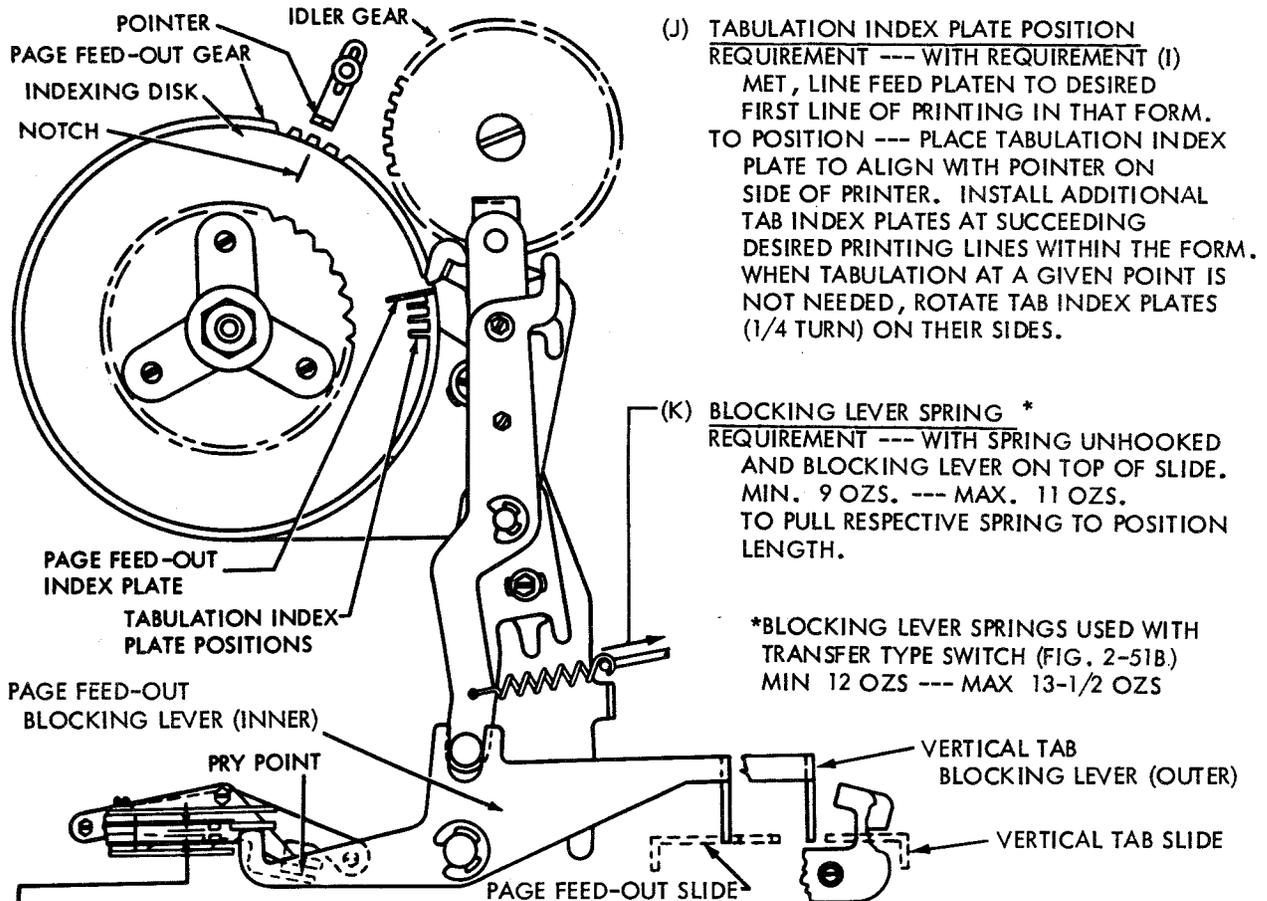
TO ADJUST - WITH TRANSMITTER CONTROL SWITCH MOUNTING SCREWS LOOSENED, POSITION THE CONTACT ASSEMBLY.

2. WITH THE NORMALLY OPEN (UPPER) CONTACTS CLOSED
- LOBE OF FEED-OUT BLOCKING LEVER (INNER LEVER) SHALL FULLY ENGAGE INSULATED EXTENSION OF CONTACT SWINGER.
 - THE FEED-OUT BLOCKING LEVER SHALL REST FIRMLY ON THE FUNCTION ARM GUIDE BAR (INTERNAL --- CHECK BY LIFTING LEVER LIGHTLY AT CONTACT END) AND ALSO SEPARATE THE NORMALLY OPEN CONTACT SPRING FROM IT STIFFENER AS THE UPPER CONTACT CLOSES.
- TO CHECK --- SELECT FEED-OUT CODE COMBINATION, ROTATE MAIN SHAFT UNTIL FEED-OUT SLIDE IS IN ITS EXTREME FORWARD POSITION AND FEED-OUT BLOCKING LEVER DROPS BEHIND ITS SLIDE TO CLOSE NORMALLY OPENED CONTACTS.
- TO ADJUST --- WITH CONTACT PILE-UP MOUNTING SCREWS LOOSENED, POSITION THE ASSEMBLY.
3. WITH THE NORMALLY OPEN (UPPER) CONTACTS CLOSED
- LOBE OF VERTICAL TABULATOR BLOCKING LEVER (OUTER) SHALL FULLY ENGAGE THE INSULATED EXTENSION OF THE SWINGER.
 - THE VERTICAL TABULATOR BLOCKING LEVER SHALL REST FIRMLY ON THE FUNCTION ARM GUIDE BAR (INTERNAL --- CHECK BY LIFTING LEVER LIGHTLY AT CONTACT END.) AND ALSO SEPARATE NORMALLY OPEN CONTACT SPRING FROM ITS STIFFENER AS UPPER CONTACT CLOSES.

TO CHECK --- SELECT VERTICAL TABULATOR COMBINATION AND PROCEED AS IN ITEM TO CHECK OF REQUIREMENT 2 ABOVE.

FIGURE 5A. TYPING UNIT VERTICAL TABULATOR AND TRANSMITTER DISTRIBUTOR CONTROL

VERTICAL TABULATION AND TRANSMITTER DISTRIBUTOR CONTROL

TRANSMITTER CONTROL SWITCH (TRANSMITTER CONTROL ONLY)REQUIREMENTS --- FOR SINGLE-CONTACT TYPE CONTROL

1. WITH TRANSMITTER CONTROL CONTACTS CLOSED, THERE SHOULD BE SOME CLEARANCE BETWEEN INSULATED EXTENSION OF SWINGER AND LOBE OF FEED-OUT AND VERTICAL TABULATOR BLOCKING LEVERS.
 TO CHECK - ROTATE MAIN SHAFT UNTIL FEED-OUT AND VERTICAL TABULATOR BLOCKING LEVERS ARE UNOPERATED (RESTING ON TOP OF SLIDES).
 TO ADJUST - POSITION THE CONTACT ASSEMBLY WITH ITS MOUNTING SCREWS LOOSENED.
2. WITH TRANSMITTER CONTROL CONTACTS OPENED BY FEED-OUT BLOCKING LEVER, CLEARANCE BETWEEN SWITCH CONTACTS SHALL BE
 MIN 0.010 INCH ----- MAX 0.020 INCH
 TO CHECK - SELECT FEED-OUT CODE COMBINATION. ROTATE MAIN SHAFT UNTIL FEED-OUT SLIDE IS IN ITS EXTREME FORWARD POSITION AND FEED-OUT BLOCKING LEVER DROPS BEHIND ITS SLIDE TO OPEN CONTACTS
 TO ADJUST - REFINE REQUIREMENT NO. 1 ABOVE.
3. WITH CONTROL CONTACTS OPENED BY VERTICAL TABULATOR BLOCKING LEVER, CLEARANCE BETWEEN SWITCH CONTACTS SHOULD BE
 MIN 0.010 INCH ----- MAX 0.020 INCH
 TO CHECK - SELECT VERTICAL TABULATOR CODE COMBINATION. ROTATE MAIN SHAFT UNTIL VERTICAL TAB SLIDE IS IN ITS EXTREME FORWARD POSITION AND VERTICAL TABULATOR BLOCKING LEVER DROPS BEHIND ITS SLIDE
 TO ADJUST - REFINE REQUIREMENT NO. 1. ABOVE.

FIGURE 5B. TYPING UNIT, VERTICAL TABULATOR AND TRANSMITTER DISTRIBUTOR CONTROL

VERTICAL TABULATION AND TRANSMITTER DISTRIBUTOR CONTROL

(1) PAGE FEED-OUT INDEX PLATE POSITION

REQUIREMENT --- PLACE AN INDEX PLATE IN THE NUMBERED SLOTS ON DISK CORRESPONDING TO LENGTH OF PAGE FORM TO BE USED. SYNCHRONIZE PAGE FEED-OUT WITH A FORM BY POSITIONING FORM SO THAT TYPING UNIT WILL PRINT IN FIRST TYPING LINE OF THE FORM. WHEN TYPING UNIT IS IN STOP POSITION, TOP OF RIBBON GUIDE SHOULD ALIGN WITH BOTTOM OF PRINTING LINE.

TO POSITION --- WITH PAGE FORM IN DESIRED POSITION, DISENGAGE PAGE FEED-OUT GEAR FROM ITS IDLER GEAR. ROTATE FEED-OUT GEAR UNTIL NOTCH IN INDEXING DISK ALIGNS WITH POINTER ON SIDE OF PRINTER, RE-ENGAGE GEARS.

SWITCH CONTACTS (TRANSMITTER CONTROL ONLY)

REQUIREMENTS --- FOR TRANSFER TYPE CONTROL SWITCH

1. WITH NORMALLY CLOSED (LOWER) CONTACTS CLOSED, LIFT SWINGER FREE OF MATING CONTACT. IT SHALL REQUIRE A MINIMUM OF 30 GRAMS TO MOVE LOWER CONTACT SPRING AWAY FROM ITS STIFFENER.

TO ADJUST - FORM THE LOWER CONTACT SPRING BY BENDING.

2. WITH LOWER CONTACT CLOSED

MIN 30 GRAMS ----- MAX 45 GRAMS.

TO MOVE SWINGER FROM ITS MATING CONTACTS.

TO ADJUST - FORM THE SWINGER BY BENDING.

3. WITH LOWER CONTACT CLOSED

(a) GAP BETWEEN UPPER CONTACT AND MATING CONTACT OF SWINGER

MIN 0.008 INCH ----- MAX 0.015 INCH

TO ADJUST - POSITION STIFFENER OF NORMALLY CLOSED CONTACT.

(b) WITH A GAP OF 0.008 TO 0.015 INCH, IT SHALL REQUIRE

MIN 25 GRAMS ----- MAX 35 GRAMS

TO PULL UPPER CONTACT AWAY FROM ITS STIFFENER

TO ADJUST - FORM THE UPPER CONTACT SPRING BY BENDING.

RECHECK REQUIREMENT (a).

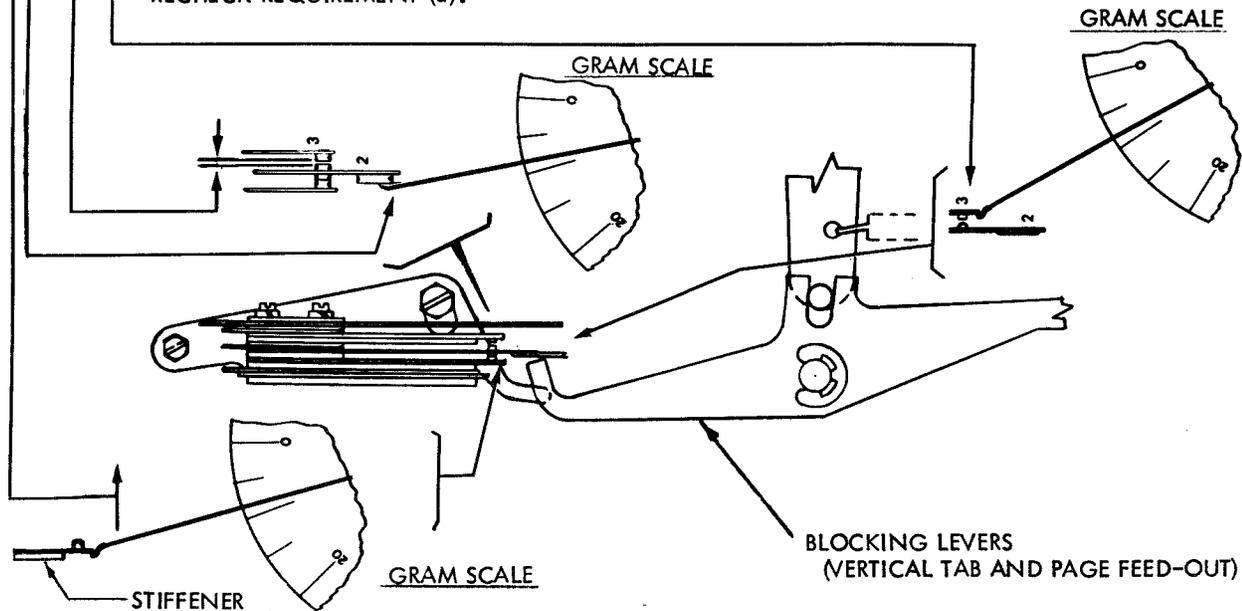
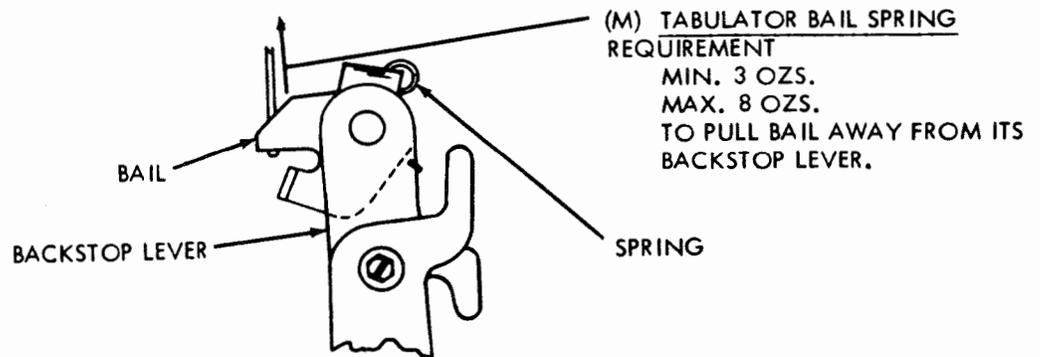


FIGURE 5C. TYPING UNIT, VERTICAL TABULATION AND TRANSMITTER DISTRIBUTOR CONTROL

VERTICAL TABULATION AND TRANSMITTER DISTRIBUTOR CONTROL

- (L) LINE FEED CLUTCH TRIP LEVER SPRING
SEE STANDARD ADJUSTMENT



- (O) STUNT BOX SWITCH SPRING
SEE STANDARD ADJUSTMENT

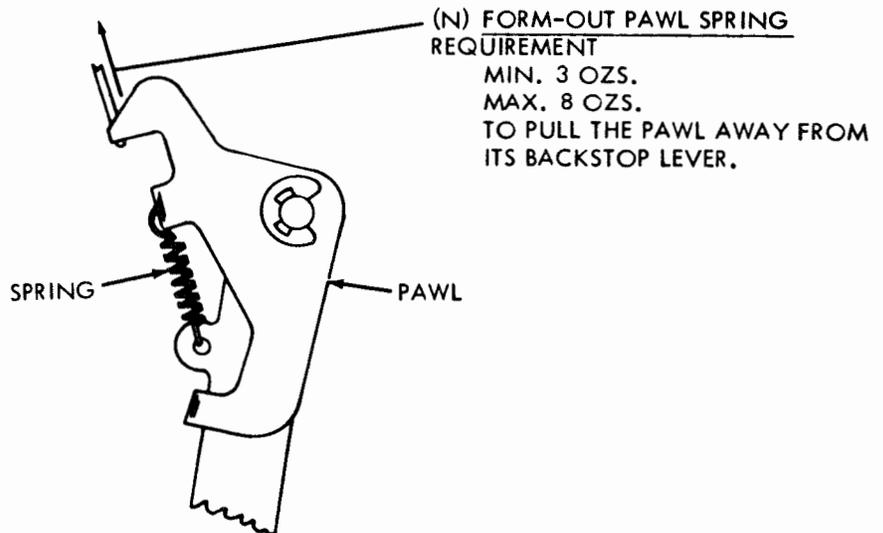


FIGURE 6. TYPING UNIT, VERTICAL TABULATION
AND TRANSMITTER DISTRIBUTOR CONTROL

VERTICAL TABULATOR AND TRANSMITTER DISTRIBUTOR CONTROL

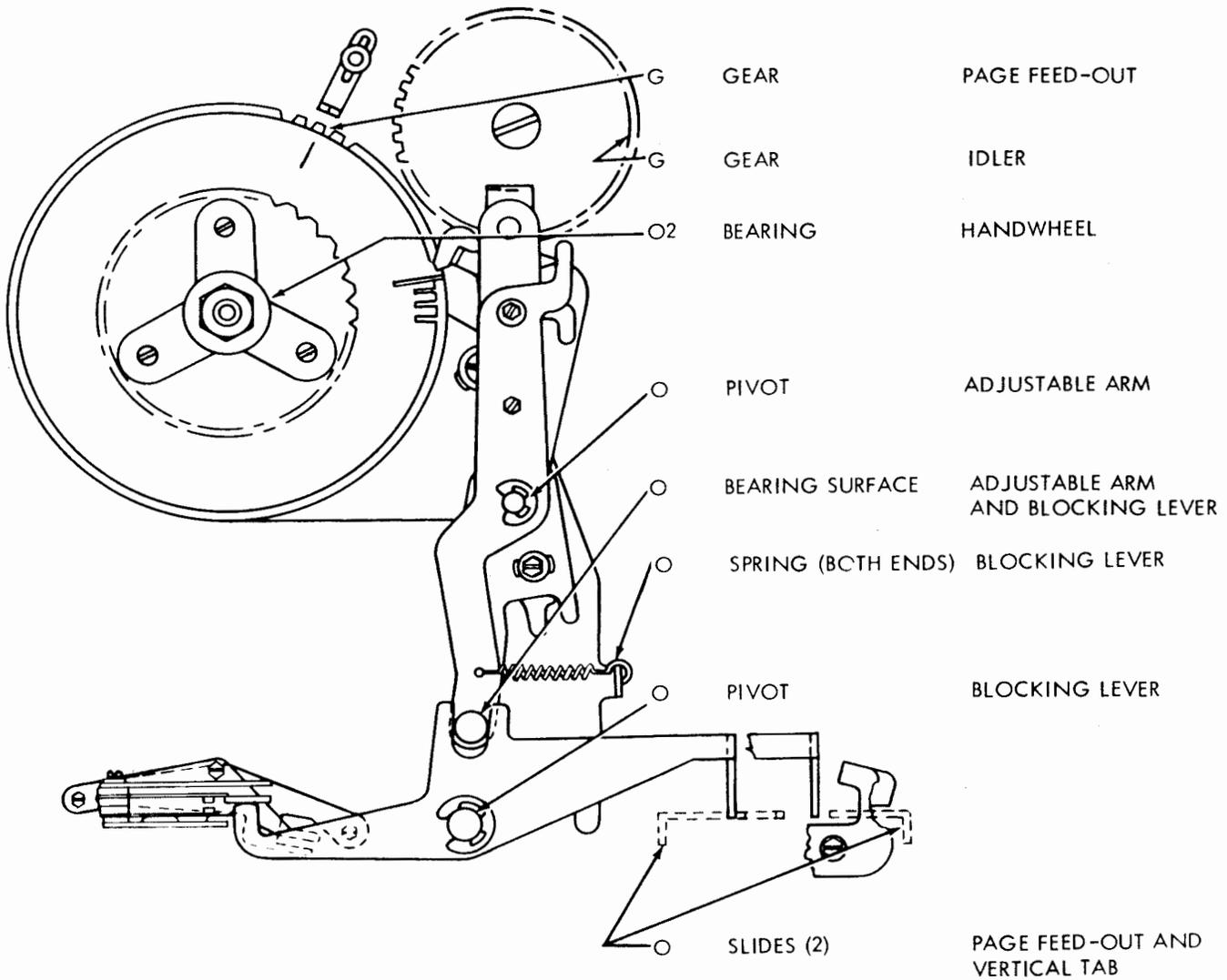


FIGURE 6A. TYPING UNIT, VERTICAL TABULATION AND TRANSMITTER DISTRIBUTOR CONTROL

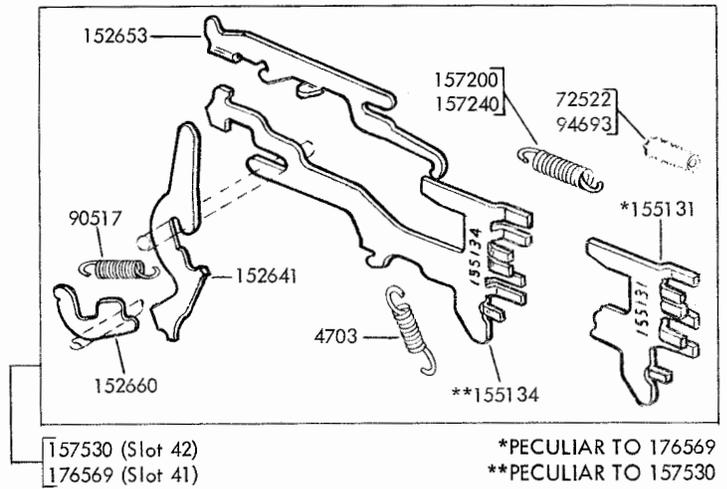
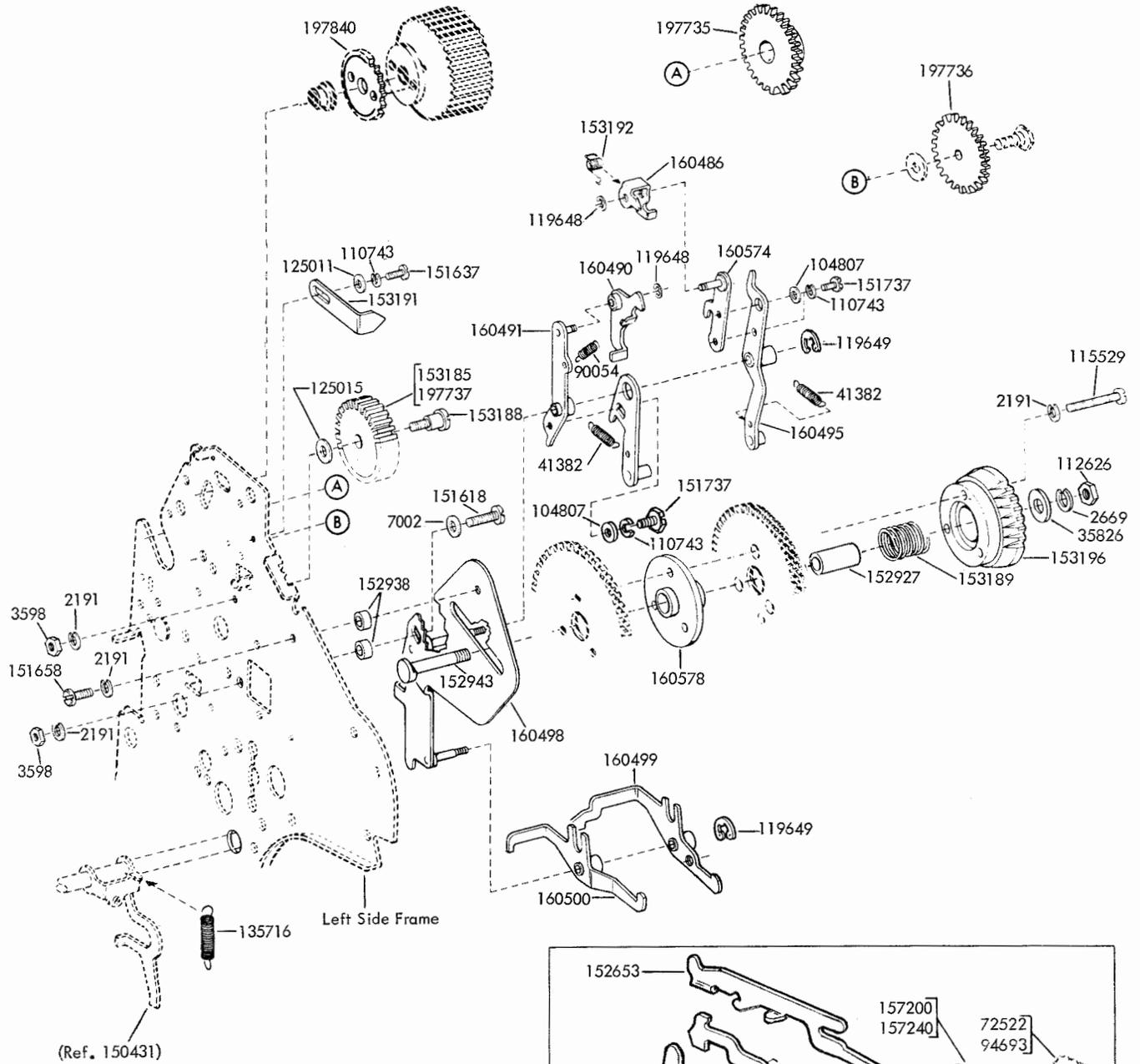


FIGURE 7.

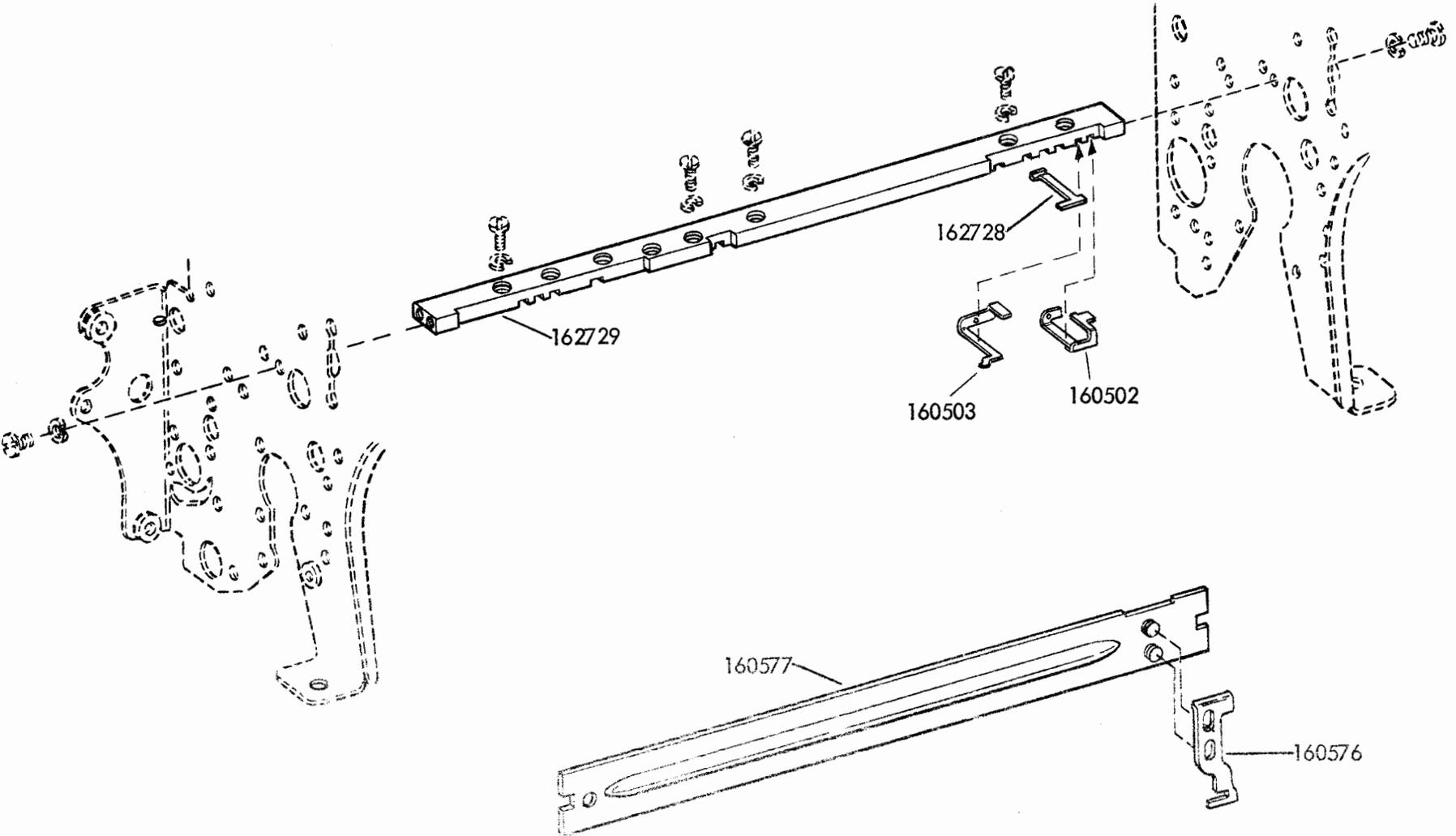
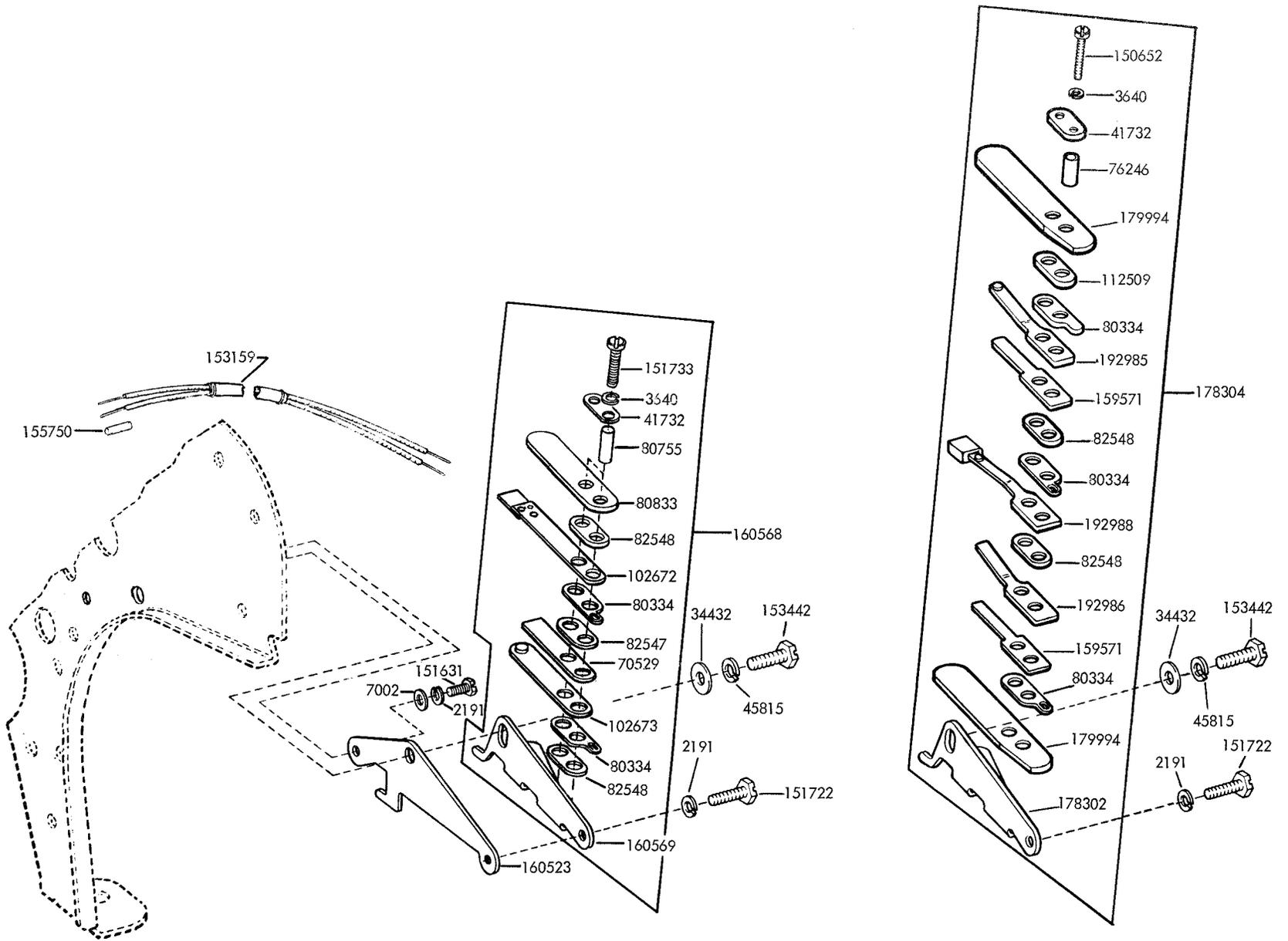
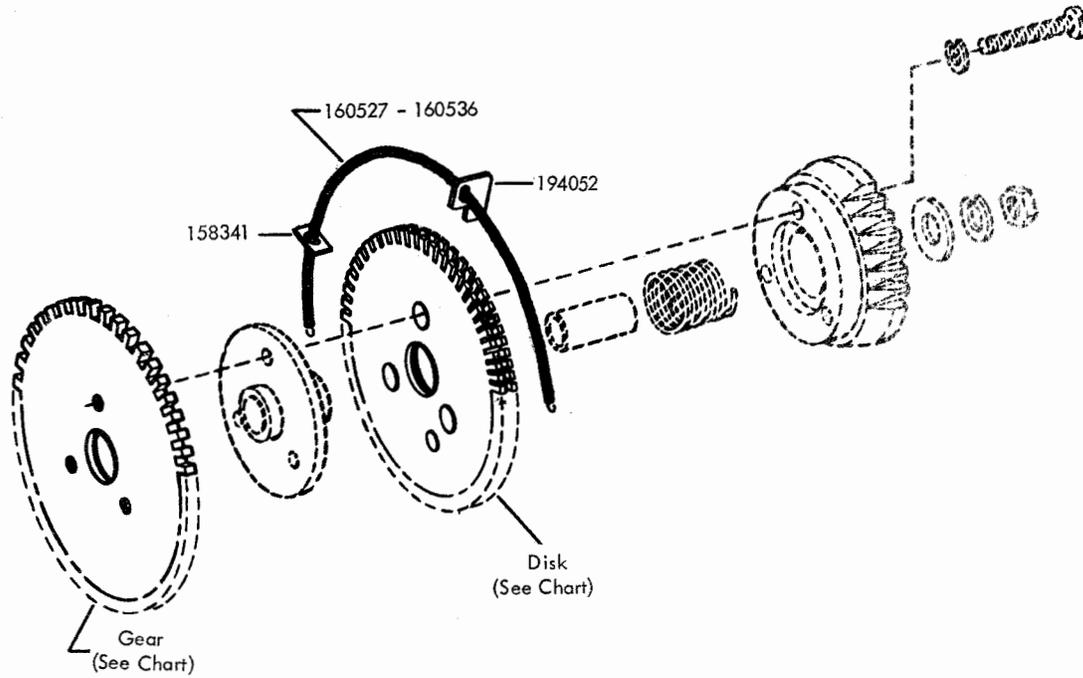


FIGURE 8. 154770 MODIFICATION KIT TO ADD VERTICAL TABULATION (SPROCKET FEED) INCLUDES ALL PARTS ON THIS PAGE AND ON FIGURES 7 AND 9.

FIGURE 9.





FORM LENGTH IN INCHES	MOD KIT	GEAR NO.	DISK NO.	SPRING NO.
8, 4, 2	154760	153198	160505	160527
8-1/2	154761	153199	160506	160528
9, 4-1/2	154762	153200	160507	160529
9-1/2	154763	153201	160508	160530
10, 5	154764	153202	160509	160531
11, 5-1/2	154765	153203	160510	160532
12, 6, 3	154766	153204	160511	160533
13, 6-1/2	154767	153205	160512	160534
14, 7, 3-1/2	154768	153206	160513	160535
7-1/2, 15	154769	153207	160514	160536
14-2/3, 7-1/3, 3-2/3	192706	161250	192704	160536
6-1/2, 3-1/4	197849	197732	197734	160534
4-1/4	197850	197731	197733	160528

154760 THROUGH 154769, 192706, 197849 AND 197850 MODIFICATION KITS
TO PROVIDE GEAR, DISK AND SPRING FOR VERTICAL TABULATION

FIGURE 10.